INSERTABLE PIXEL SYSTEM

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Proposal for Non-Clam-shelled Fully Insertable Pixel system

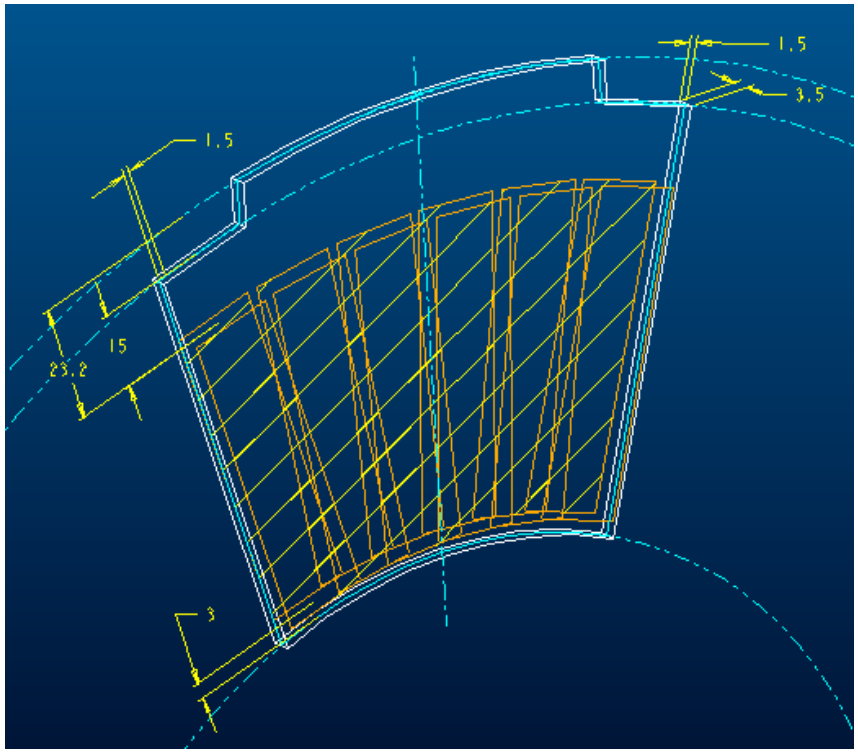
- **Clam Shell not necessary if Beam Pipe is not contiguous**
  - Short Access configuration does not allow introduction of anything as large as a full Pixel system to the access volume
  - During Long Access configuration AE is pulled back and off-axis along with its beam pipe section
- **Clam Shelling of part of detector is only necessary to clear Beam Pipe Flange**
  - Propose same B-layer design/dimension and similar support scheme as presented in Beampipe review in May
  - Extend B-Layer installation scheme to entire Pixel Frame
- **Proposal keeps same functional frame elements intact**
  - Global support frame is not clam-shelled
  - Staves and Barrels same in design but smaller
  - B-layer is the same
- **However: Disks and Frame must change parametrically**

How Big is the Frame

- **Model of Insertable Pixel generated using parametric modification of existing parts**
- **Layout rules for sectors same as current sector, but with less modules**
- **Frame Layout**
  - assumes same joint geometries, with more narrow panels
  - Layout of frame was scaled to an 8-sector disk
- **Disks are laid in for 3hit coverage--see other talks for coverage, and holes**
  - Disk Service routing on the inside of the frame determines how small the frame can be
  - Minimal disk size is 8-sector disk--any smaller does not allow B-layer installation
  - a 9-sector disk in the first position is necessary to allow coverage
    - layouts with all 8-sector disks were initially evaluated--this is the frame size required for an all-8-sector layout as well
    - a 9 is possible only in the first position with a modified cooling tube exit

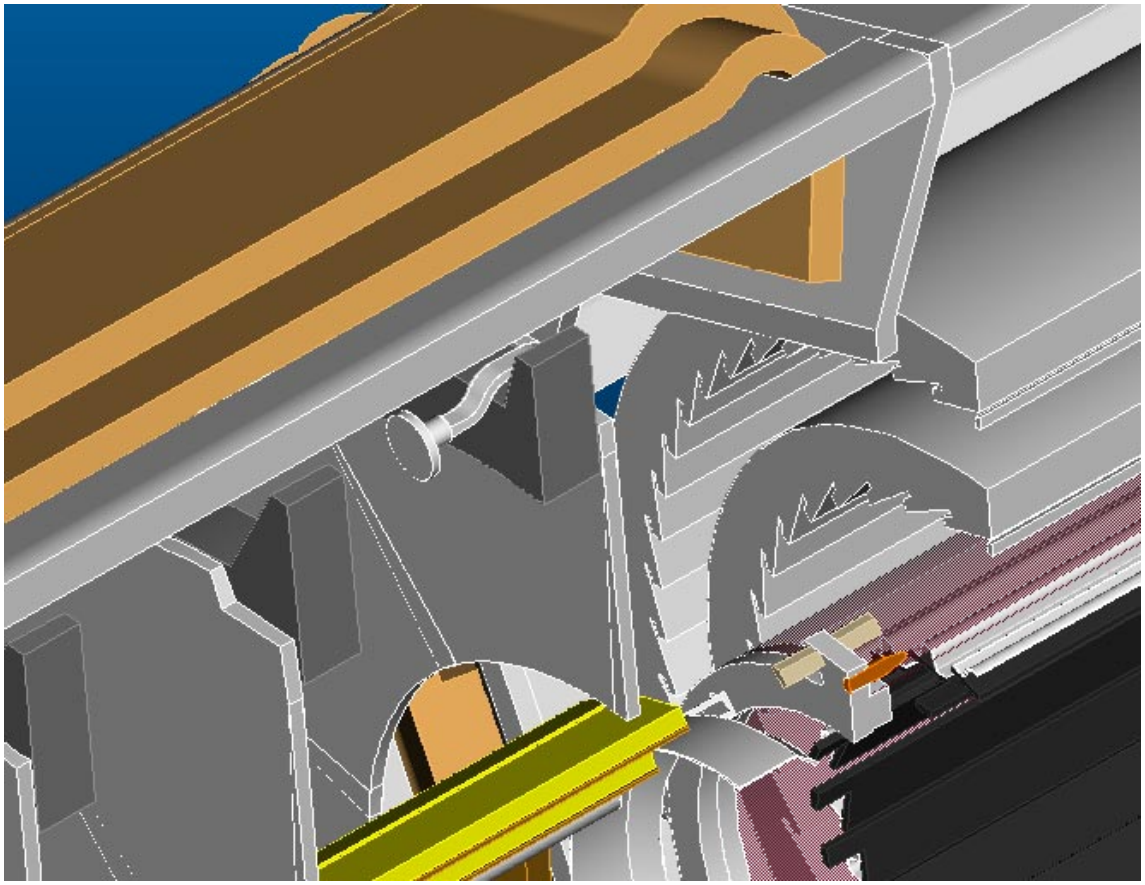
Pixel Detector

Disk layout



- **8-sector disk is minimum size**
  - 3.2% loss
  - B-Layer envelope
- **Disk Layout Rules**
  - Modules laid out with 1mm gaps in polar array
  - Outer Disk Radius=module envelope +23.2mm
  - Inner Disk Radius=module envelope - 3mm
- **Rules above have held true for 12, 11, 10, and 9 sector disks--should also hold for 8**
- **Distance from cooling tubes to edge of sector facing needs detail work to determine sector performance**

Service routing defines envelopes

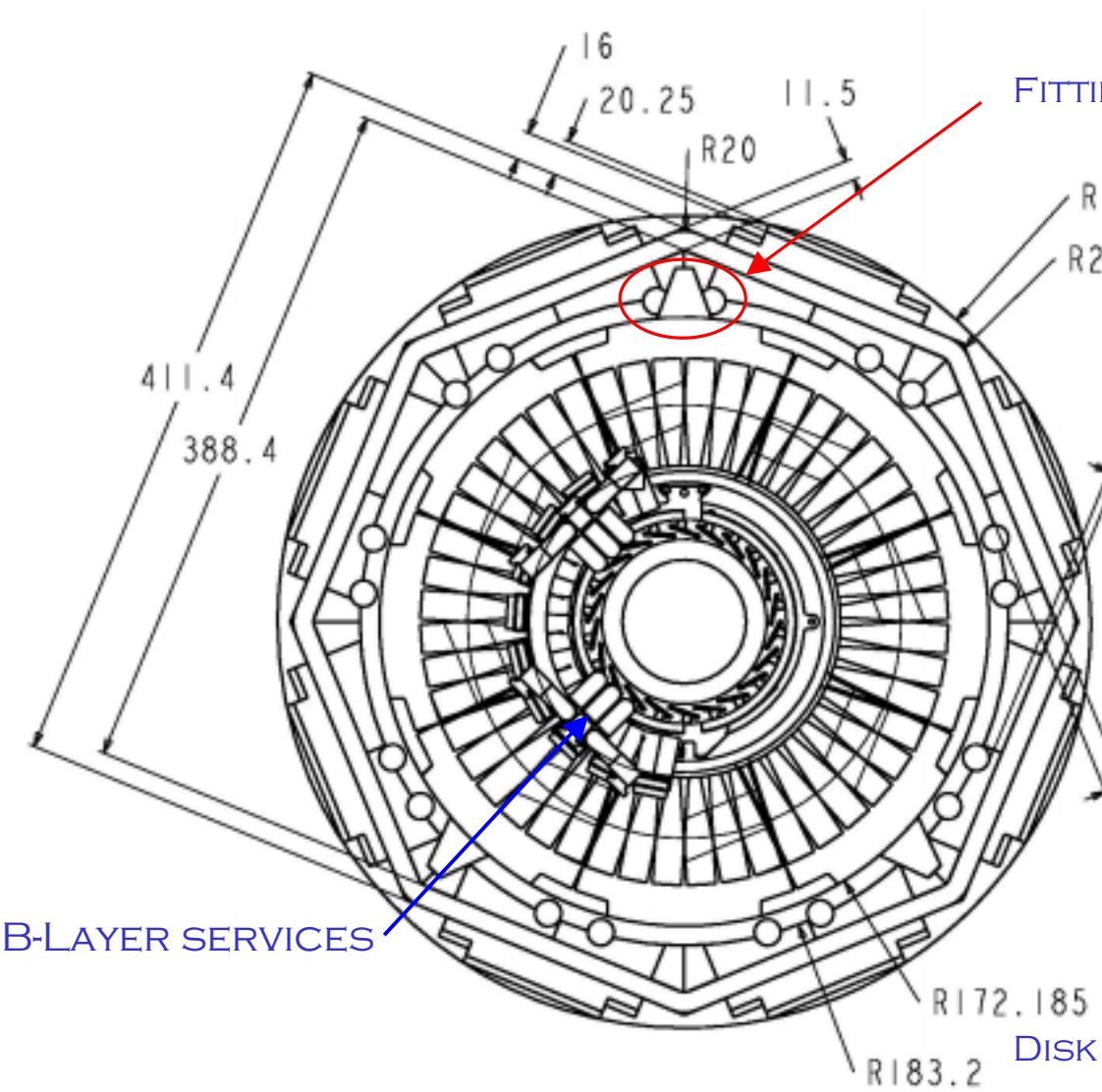


- Disk 1 services must pass around a reversed disk- 11mm has been allotted for this
- Cooling tubes from disk 1 must snake around the ring and to smaller radius to accommodate the fitting
- Disk 1 is reversed to allow barrel services to be routed out of the frame-the position of disk one uses the gap defined in the baseline

Following slide shows end view of the internal and external envelopes
Service runs have been allotted using bundles designed for baseline detector

Pixel Detector

Detector End View



Fittings clear ears

R229.775 ENVELOPE

R221

Frame outer radius

4.873

Minimum clearance

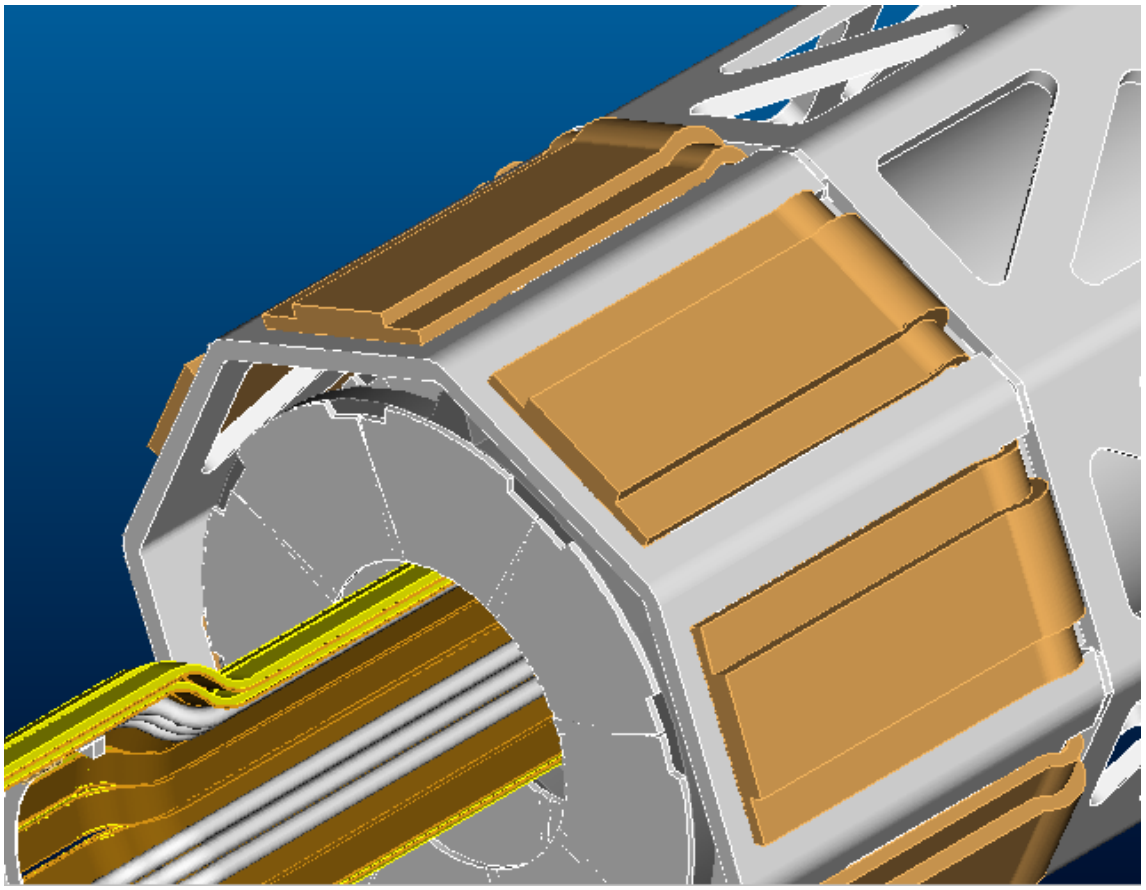
11

Nominal clearance

Disk outer radii

Pixel Detector

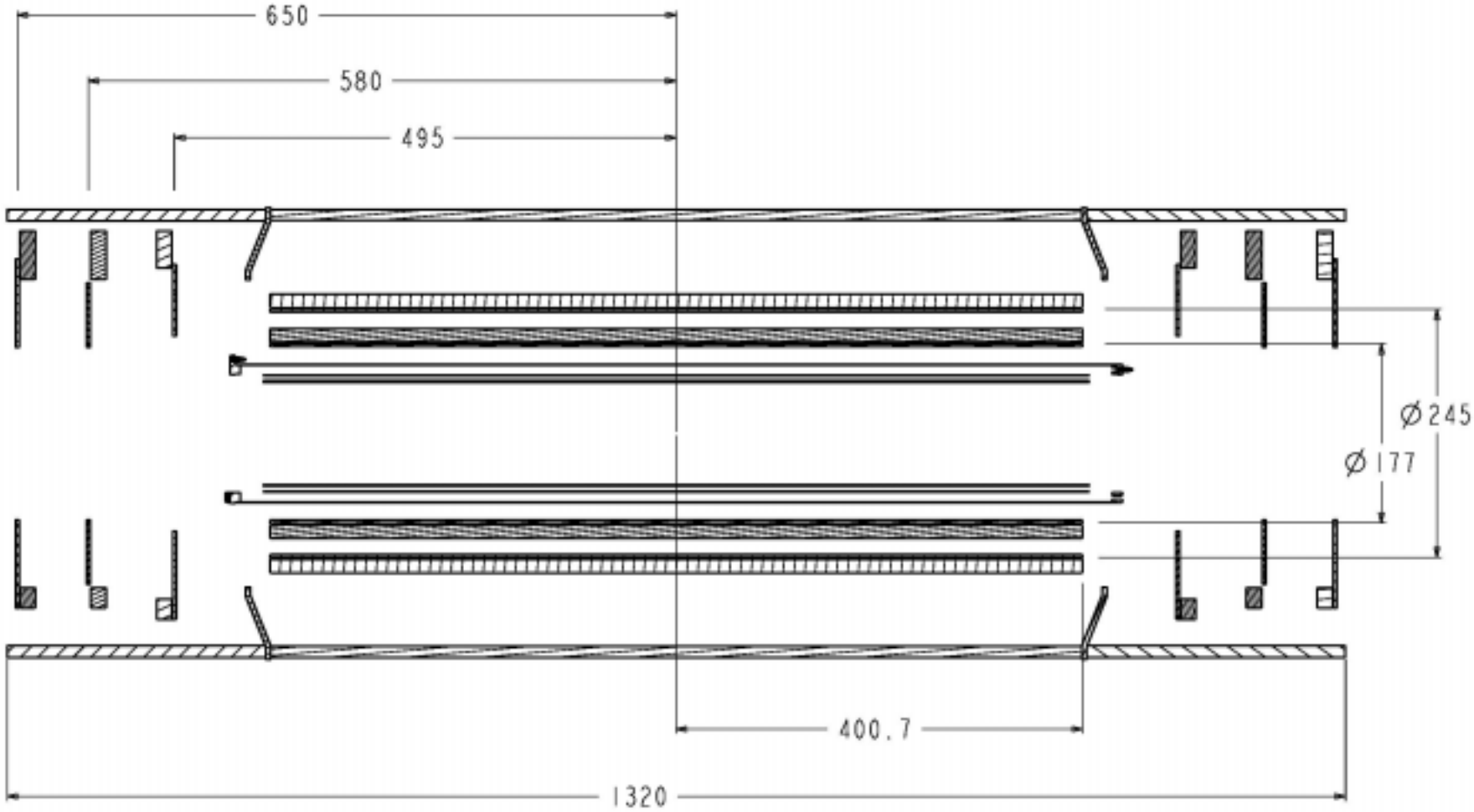
Services define outer envelope



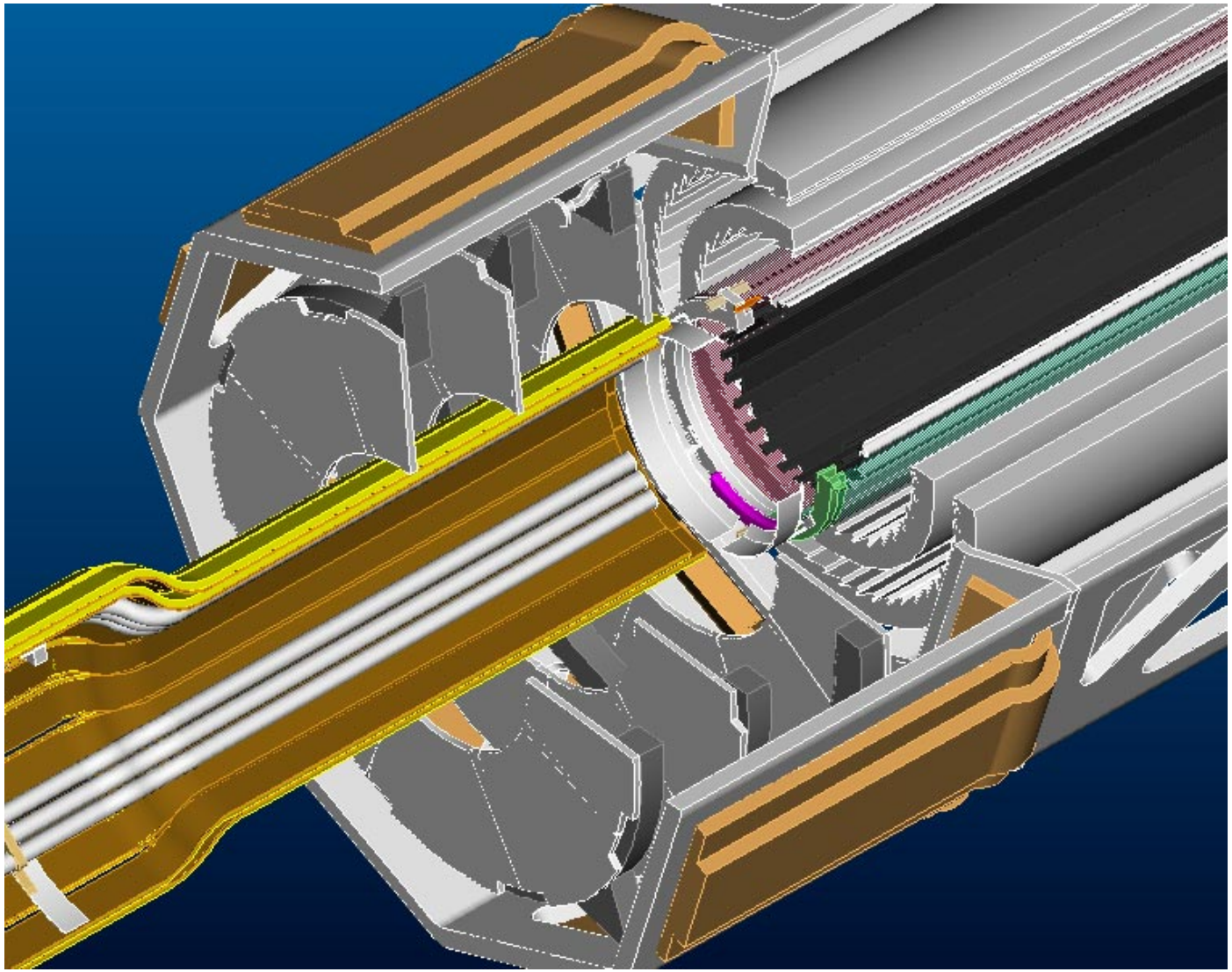
- **Barrel Services need to be reduced in width to fit through a narrower panel**
- **Only 4 less staves than in baseline, so 4 octants have the same number of barrel services as baseline**
- **Corner of Bump on frame penetration is the envelope--most of the services are under that**

Barrel Services are a major part of the envelope definition. These models use the same data for routing which has been verified with service mockups--they are conservative, but accurate

Detector Envelope Elevation



Detail Section of Frame End



Pixel Detector

Full Frame Section